

Exploring Medical Students Interest In Radiology As A Career Path: Factors Influencing Specialization Choices In The Context Of Technology, Patient Care, And Academic Exposure In Nigeria.

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Abstract

Background: The choice of medical specialties has become increasingly relevant, especially in radiology. This study aims to document the perceptions and factors that inform medical students to choose radiology as their career area and to identify factors influencing the perceptions of radiology as a speciality in a medical school in Nigeria.

Methods: This study employed a cross-sectional survey methodology. A total of 314 medical students from a medical school in southern Nigeria filled out an online structured questionnaire to assess their interest in pursuing a career in radiology. The tool measured numerous factors affecting career interest, including technological appeal, collaboration opportunities, work-life balance, and financial stability. Data was interpreted using descriptive statistics, chi-square tests, and thematic analysis.

Results: 12.4% of respondents intended to specialise in radiology. Factors perceived to influence interest positively were technological innovation appeal and work-life balance. Gender had no significant relationship ($P=0.203$); however, the academic year of study and the age of the students were significant ($P=0.019$, $P=0.082$, respectively). Thematic analysis revealed that a lack of patient interaction and poor exposure to radiology during training were reasons for the lack of interest in radiology as a speciality.

Conclusion: These findings show a need for more incorporation of radiology into the medical curriculum and mentorship programs, which will stimulate interest in this fundamental speciality. Clearing myths about patient contact will further enhance interest and improve the future supply of competent radiologists in Nigeria.

Keywords: Radiology, Choice of Specialty, Technological Innovation, Medical Students.

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I. Introduction

In recent years, medical staffing has dramatically changed from a huge demand for primary care physicians in the twentieth century to a demand for medical specialists [1]. Medical science progressed to such a stage that it became impossible to master all fields but to choose one or two out of several specialties by the end of the nineteenth century. Thus, specialization became indispensable in modern medicine [2]. It is worth noting that there are a variety of medical specialties, which may be challenging to medical students owing to the many factors that must be accounted for when choosing a profession or area of specialization. A proper understanding of the factors leading to the choice of a specialty is very important if the job market requirements/necessities are to be addressed [3]. Radiology, as a field of specialization in its own right, has gained international recognition as well as elicited many promising predictions [4]. The circumstances have changed to the favour of radiologists for whom there currently exists a shortage; it was remarkable, up until recent times at least, for hospital-based doctors, including both radiologists as well as anesthesiologists, to perhaps experience less career security than most other groups within the ranks of specialist physicians [1]. The Radiologists' roles have, over recent times, expanded to include aspects of economic gatekeeping, public health provision, political advocacy information technology and patient well-being. Radiologists continue to make significant contributions/influences in the health care system through their roles [4]. A lot of research has been performed worldwide including studies from Saudi Arabia, the USA, Canada, Japan and Ghana on investigating the factors that affect specialty choices among medical students.

One previous study identified program location and the availability of subspecialty training as major determinants in the selection of residency programs [5, 6]. Another study noted research opportunities, work-

life balance, and program reputation as equally influential in determining choice [7, 8]. In addition, a study has shown that the quality of life, cost of living, and availability of recreational activities in the location of the residency program were significant factors in the choice of a residency program [9]. Lifestyle considerations have increasingly been an important factor in the career decisions of potential residents [10, 11]. Moreover, mentors, social support systems, and the opportunity to experience practice in a rural or underserved area became major influencers of this decision. In addition, a study suggested that familiarity with various medical specialties, a supportive working environment, and the opportunities for financial security were critical factors affecting the process of choosing a career and professional growth [12]. Research into the determinants influencing the choice of radiology in Nigeria and Sub-Saharan Africa as a career among medical students is limited. In parallel, Nigeria and Sub Sahara Africa faces a growing need for skilled radiologists across its vast regions. To address this urgent health need, the current study investigated the perceptions of medical students at a medical school in Southern Nigeria.

II. Materials And Method:

A cross-sectional survey methodology using a structured questionnaire distributed to medical students in a medical school in southern Nigeria- the University of Port Harcourt Medical School, was used to assess their interest in pursuing a career in radiology. The study used a validated questionnaire designed by the researchers utilising prior material to address essential domains. Participation in the survey was voluntary, and no identifying information was gathered from the students. Informed consent was acquired from every student. The questionnaire consisted of statements rated on a five-point Likert scale, capturing students` perceptions of various factors influencing their interest, including technological innovation, collaboration with other specialties, financial stability, work-life balance, and opportunities for professional development. The survey was administered online through Google Forms, and 314 medical students responded. Thematic analysis was used to analyze prevailing themes. Statistical analyses, including descriptive statistics, chi-square tests, and calculation of Likert means, were conducted to explore the associations between demographic factors (age, gender and academic year) and interest in radiology. Significance was taken at $p=0.01$. The open-ended responses were analyzed qualitatively to identify additional factors influencing career choice.

III. Result

Study population

Figure 1 shows the study population. A total of 314 students participated in the study, with the highest response rates from the age group 24-29, followed by 18-23, with the least participation from individuals over 35. Younger medical students were the predominant respondents in this survey.

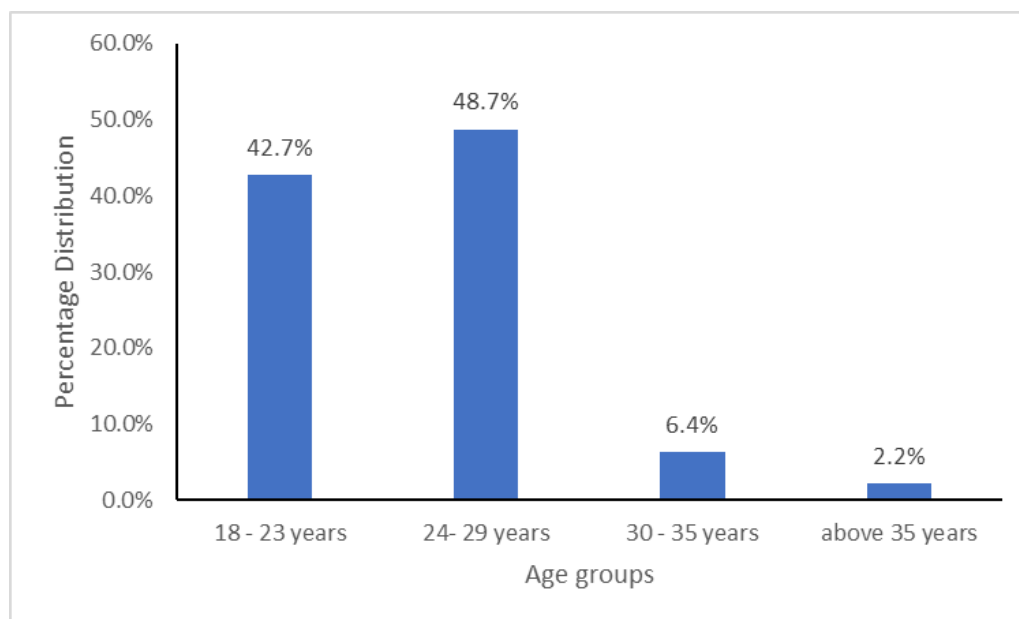


Figure 1: Age distribution of Participants

Gender Representation:

Figure 2 shows the gender profile of the students. The results indicated that female students participated heavily in the study.

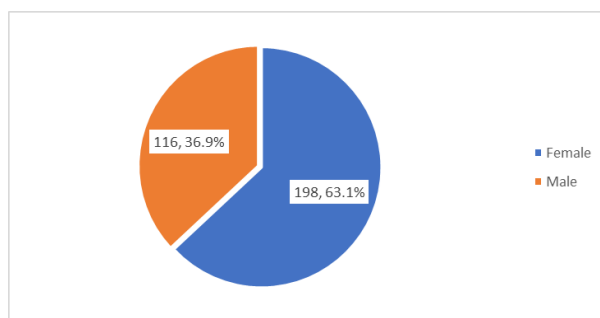


Fig 2

Distribution of year of study.

Figure 3 shows the students' years of study. The year of study distribution revealed that Year 6 students showed the highest participation, followed by Year 5. Year 4 had the least participation.

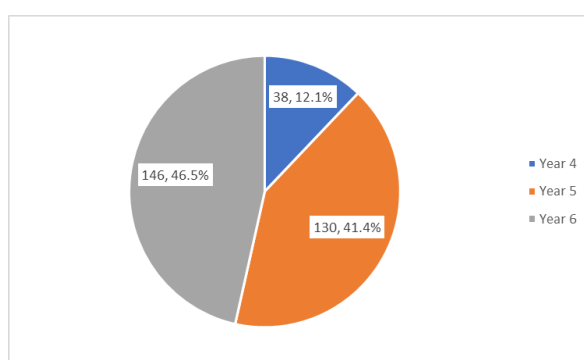


Figure 3: Distribution of year of study among participants

Perception of Radiology as a Career Path: Likert Scale Responses and Mean Scores.

Table 1: Responses, Likert Mean and Remarks of Respondents

S/No	Statements	SD n, (%)	D n, (%)	N n, (%)	A n, (%)	SD n, (%)	Likert Mean	Remark
1.	The level of technology and innovation involved in radiology appeals to me as a potential career path	37(11.8)	52(16.6)	111(35.4)	74(23.6)	40(12.7)	3.09	Accepted
2.	I believe radiology plays an important role in early diagnosis and treatment of various medical conditions	0(0.0)	7(2.2)	14(4.5)	83(26.4)	210(66.9)	4.58	Accepted
3.	The exposure to radiology during my medical education has positively influenced my interest in pursuing a career in radiology	52(16.6)	72(22.9)	133(42.4)	33(10.5)	24(7.6)	2.70	Accepted
4.	The potential for collaboration with other medical specialties in radiology is a factor that positively influences my interest in pursuing a career in radiology	25(8.0)	69(22.0)	109(34.7)	103(32.8)	8(2.5)	3.00	Accepted
5.	The potential for financial stability and job security in radiology is a factor that positively influences my interest in pursuing a career in radiology	38(12.1)	72(22.9)	110(35.0)	74(23.6)	20(6.4)	2.89	Accepted
6.	The opportunity to work in a range of settings such as hospitals, clinics, and private practice is a factor that positively influences my interest in pursuing a career in radiology	32(10.2)	56(17.8)	77(24.5)	118(37.6)	31(9.9)	3.19	Accepted
7.	The potential for flexibility and work-life balance in radiology is a factor that positively influences my interest in pursuing a career in radiology	26(8.3)	52(16.6)	55(17.5)	104(33.1)	77(24.5)	3.49	Accepted
8.	The potential for financial stability and job security in radiology is a factor that positively influences my interest in pursuing a career in radiology	32(10.2)	45(14.3)	121(38.5)	77(24.5)	39(12.4)	3.15	Accepted
9.	The potential for professional development and continuing education opportunities in radiology is a factor that positively influences my interest in pursuing a career in radiology	38(12.1)	49(15.6)	76(24.2)	124(39.5)	27(8.6)	3.17	Accepted
10.	The level of patient interaction in radiology is a factor that positively influences my interest in pursuing a career in radiology	38(12.1)	109(34.7)	77(24.5)	77(24.5)	13(4.1)	2.74	Accepted
11.	The potential for international job opportunities in radiology is a factor that positively influences my interest in pursuing a career in radiology	20(6.4)	63(20.1)	72(22.9)	108(34.4)	51(16.2)	3.34	Accepted
12.	The potential to improve patient outcomes and quality of life through radiology is a factor that positively influences my interest in pursuing a career in radiology	20(6.4)	44(14.0)	76(24.2)	133(42.4)	41(13.1)	3.42	Accepted

13.	The potential for job satisfaction in radiology is a factor that positively influences my interest in pursuing a career in radiology	45(14.3)	56(17.8)	113(36.0)	73(23.2)	27(8.6)	2.94	Accepted
14.	The potential to be involved in cutting-edge medical technology and advancements in radiology is a factor that positively influences my interest in pursuing a career in radiology	26(8.3)	30(9.6)	95(30.3)	103(32.8)	60(19.1)	3.45	Accepted
15.	The potential to work with a variety of patient populations, including children and the elderly, in radiology is a factor that positively influences my interest in pursuing a career in radiology	39(12.4)	50(15.9)	78(24.8)	120(38.2)	27(8.6)	3.15	Accepted
16.	The potential for a challenging and intellectually stimulating career in radiology is a factor that positively influences my interest in pursuing a career in radiology	32(10.2)	44(14.0)	86(27.4)	118(37.6)	34(10.8)	3.25	Accepted
17.	The potential for a wide range of sub-specialties within radiology is a factor that positively influences my interest in pursuing a career in radiology	26(8.3)	43(13.7)	100(31.8)	125(39.8)	20(6.4)	3.22	Accepted
18.	The potential for interdisciplinary collaboration in radiology is a factor that positively influences my interest in pursuing a career in radiology	26(8.3)	66(21.0)	67(21.3)	122(38.9)	33(10.5)	3.22	Accepted
19.	The possibility of a wide range of tasks and responsibilities in radiology influences my interest in pursuing a career in radiology	32(10.2)	50(15.9)	89(28.3)	124(39.5)	19(6.1)	3.15	Accepted

The statements are accepted when Likert Mean >2.5, otherwise the statement is rejected Thematic analysis of the perception of Radiology as a Career Path.

Table 4 The thematic analysis of the Likert-scale responses explores several key themes related to medical students' perceptions of radiology as a career path:

Perception of Technology and Innovation	Statements 1 and 14 focus on the appeal of technology and innovation in radiology, garnering a significant level of acceptance (Mean scores of 3.09 and 3.45, respectively). This reflects a growing interest among medical students in fields incorporating advanced medical technologies, which can be appealing and relevant in modern healthcare.
Impact of Education and Exposure	Statement 3 addresses how exposure to radiology during medical education influences students' interests, marked by a mean score of 2.70, indicating mixed feelings. This suggests that while some students may find their interest stimulated, a substantial portion may not perceive their exposure to radiology as sufficient to spark a strong career aspiration, highlighting potential gaps in curricular engagement.
Collaboration and Interdisciplinary Opportunities	Statements 4 and 18 discuss the importance of collaboration with other medical specialties (Mean scores of 3.00 and 3.22). This indicates that students value the interdisciplinary approach and teamwork inherent in radiology, suggesting a recognition of the speciality's role within broader healthcare settings.
Financial Aspects and Job Security	Statements related to financial stability (Statements 5 and 8) both achieved mean scores around 2.89 to 3.19, pointing to a moderate acceptance of the idea that radiology may offer good financial and job security. While it is positively regarded, it does not stand out as the top motivator compared to other themes.
Work-Life Balance	The theme of flexibility and work-life balance (Statement 7) achieved a mean score of 3.49, underscoring its significant importance for medical students, who are increasingly seeking careers that accommodate their personal lives alongside their professional responsibilities.
Patient Interaction and Job Satisfaction	Statements 10 and 13 highlight concerns regarding patient interaction and job satisfaction, with mean scores of 2.74 and 2.94, respectively. These low scores indicate potential disinterest or concern about patient engagement in radiology and related job satisfaction levels, signalling an area that might need attention from educators and practitioners to enhance the appeal.
Professional Development and Opportunities	The potential for professional development (Statement 9) received a mean score of 3.17, suggesting that students are aware of the opportunities for continuing education in radiology, which may influence their decisions to specialize in this field.
Diversity in Patient Populations and Responsibilities	Statements 15 and 19 emphasize the diversity in patient populations and the variety of tasks in radiology (mean scores 3.15 and 3.15), indicating an appreciation for working with different demographics and the dynamic nature of the speciality

The proportion of Medical Students Considering Radiology as a Specialty

Figure 4 illustrates the percentage of medical students considering radiology as a specialty, highlighting a relatively low level of interest among most respondents.

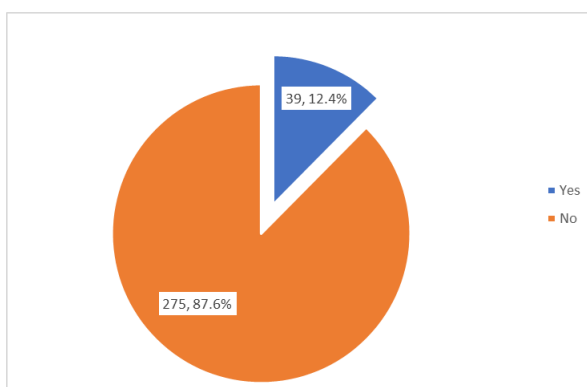


Figure 4: Distribution of Students considering radiology as an area of Specialty

Demographic Analysis of Medical Students Considering Radiology Specialization

The results from Table 2 examine the distribution of consideration in specializing in radiology by demographic data, age, gender, and academic year.

Age Group: Although younger age groups (18-23 years and 24-29 years) showed a lower percentage of respondents interested in specializing in radiology (16.4% and 7.8%, respectively), the interest among those above 35 was higher (28.6%). However, the chi-square test for age (p=0.082) suggests that this difference was not statistically significant, indicating that age may not strongly influence the consideration of radiology as a specialization.

Gender: Both females and males exhibit a relatively low level of interest in radiology specialization, with females at 10.6% and males at 15.5%. The chi-square test for gender (p=0.203) was also not statistically significant, indicating that gender differences did not significantly influence the consideration of radiology as a specialization.

Academic Year: There was a notable difference in interest based on the academic year. Year 5 students showed the highest interest (16.9%) compared to Year 6 (11.6%) and Year 4, where no students showed interest in specializing in radiology. The chi-square test for the academic year (p=0.019) was statistically significant, meaning that the year of study influences interest in radiology specialization.

Among the demographic factors, only the academic year shows a significant association with considering specializing in radiology. This indicated that students further along in their studies (particularly in Year 5) were more likely to consider radiology as a specialization. Age and gender do not significantly impact the decision to specialize in radiology in this study.

Table 1: Distribution of Consideration in specializing in radiology by demographic data

Demographic Data	Are you considering radiology as an area to specialize in?		Total n,(%)	Chi-square (p-value)
	Yes n,(%)	No n,(%)		
Age Group (years)				
18 - 23	22(16.4)	112(83.6)	134(100.0)	6.71 (0.082)
24- 29	12(7.8)	141(92.2)	153(100.0)	
30 - 35	3(15.0)	17(85.0)	20(100.0)	
above 35	2(28.6)	5(71.4)	7(100.0)	
Gender				
Female	21(10.6)	177(89.4)	198(100.0)	1.62 (0.203)
Male	18(15.5)	98(84.5)	116(100.0)	
What year are you in ?				
Year 4	0(0.0)	38(100.0)	38(100.0)	7.89 (0.019)
Year 5	22(16.9)	108(83.1)	130(100.0)	
Year 6	17(11.6)	129(88.4)	146(100.0)	

Influences on Medical Students' Decisions Regarding Radiology Specialization

Table 3 shows the factors that influence the medical students' decisions to choose radiology as a speciality. A significant majority (88.54%) did not respond, while only a few cited specific factors such as a desire to help patients, interest in technology, and the wish for work-life balance.

Table 2: Possible influences on the decision to choose the radiology speciality.

Response	Frequency (n)	Percent (%)
Not yet	19	6.05
Ability to help the patient positively	1	0.32
I like patient care	1	0.32
I love looking at images	1	0.32
I want to see patients	1	0.32
I would like a one that would give me time for my family	1	0.32
I would love to specialize in a discipline that both challenges and excites me to give my Best with a patient centered care.	1	0.32
Laudable efforts by radiology lecturers	1	0.32
Money earned	1	0.32
more time with my family	1	0.32

My passion	1	0.32
Pay	1	0.32
Personal satisfaction	1	0.32
Salary scale	1	0.32
Satisfaction and pay	1	0.32
Self-satisfaction	1	0.32
Technology involved	1	0.32
The Introduction of AI and Machine learning to it	1	0.32
No Response	278	88.54
Total	314	100.00

IV. Discussion

This study aimed to explore the general interest in and understanding radiology as a career among students in a medical school in southern Nigeria. Understanding the motivating and deterring factors in students' speciality choices is critical in cultivating favourable interest in radiology as a vital tool in modern healthcare. The findings of this study show the need for curriculum improvement to engage students actively in the field of radiology.

Among the respondents, only 12.4% of the medical students had an apparent intention to practice radiology, while 87.6% were unwilling or indecisive to join this speciality. The results presented here were similar to those of other studies from other parts of the world. A survey by Alnajjar et al. [13] in Saudi Arabia reported that only 16.1% of medical students would opt for a career in radiology. Yahesa et al. [14] reported that 18.5% of the students/interns would pursue a career in the speciality. In Ghana, 52.5% of the participants had a perceived interest in a career in radiology, even though only 23.1% would become a specialist in the field [15]. In a similar study among medical students in Morocco, no student preferred radiology as a specialisation; instead, the students preferred studying general surgery and cardiology [16]. These low rates (>18%) from various settings give credence to the importance of this study to explore the factors contributing to these findings.

The 18-29 age group was the dominant group among the participants, at 65% of participants, reflecting the typical demographic of our environment for medical students. Gender distribution was almost equal, with 52% females and 48% males, indicating that both genders were equally interested or disinterested in radiology. Seventy percent of the students were in their clinical training years, which refers to the years when students are involved in patient care under the supervision of experienced doctors, and exposure to other specialities may significantly affect their attitude.

Our study did not find gender differences in the choice of radiology, as found in a Saudi Arabian study by Alnajjar et al. [13]. The absence of this gender difference reflects perceptions rather than demographic factors in forming student attitudes toward this speciality [17]. This may contradict the literature, as work-life balance is one of the most determining factors for women in medicine when choosing their speciality, and this may impact their attitude towards the radiology speciality. Yahesa et al., [14], also stated that male students were significantly more interested in radiology; 20.5% showed interest compared to 11.1% of females. The most common reasons mentioned for the relative avoidance of radiology by females were fear of radiation and lack of contact with patients. The other significant outcome of our study was how the student's academic year influenced their perception of radiology as a future speciality. The result was statistically significant ($p = 0.019$), thus supporting the view that the more exposure students have to radiology, the greater their interest [14]. With greater exposure, students tend to appreciate the benefits of the discipline, which is usually not possible with lesser exposure. According to Branstetter et al. [18], less emphasis is given to radiology during medical studies, which leads to lesser awareness of the benefits.

Another variable in our study was age. While there was a low percentage of interest in radiology among younger age groups, such as 18-23 and 24-29 years, 16.4% and 7.8%, respectively, those above 35 years had higher interest at 28.6%. This, although through the Chi-square test, was an insignificant statistical calculation, $p = 0.082$, which means that the difference in interest between different age groups is not statistically significant, thus indicating that age might not be a significant factor in the choice of radiology.

The various reasons students are interested in radiology were indicated through thematic analysis, a method of identifying, analysing, and reporting patterns within data. Most of the respondents were positive about the technological advancements in this field, thus agreeing with the argument postulated by Avidan et al. [19] on how innovation attracts medical students. This indicates interest in shifting toward specialities encompassing innovative focuses on healthcare solutions, supported by an emphasis on accurate and personalised medical care.

There was a strong feeling of a possible lack of exposure to radiology in the curricula despite the attraction to modern technology; the mean score was 2.70, indicating shortfalls in the prevailing curriculum, which is not strong enough to provide adequate strength to generate interest in this speciality. Branstetter et al. [18] pointed out that an earlier study found that more prolonged practical exposure to radiology in student days

leads to greater interest in the speciality. Revamping radiology teaching concepts to give them a practical approach, workshops, and clinical exposures will increase appreciation for this important branch of science.

Other important reasons included work-life balance, as depicted by an average score of 3.49. Most health workers prefer careers that offer flexibility and free time, a change in society's perception of working patterns [21]. Being more organised in terms of working hours than other specialities, Radiology is attractive for those who value personal life and professional commitments.

The second lowest is the extent to which radiologists interact with patients, which averaged 2.74. According to Sarikhani et al. [22], medical students prefer specific specialities during training because they believe that there would be close contact with the patient in such specialities. So, such misconceptions must be corrected, emphasising that direct contact with patients is essential in multidisciplinary teams discussing findings from diagnostics. It was also noted that they developed an appreciation for the speciality by understanding how radiologists influenced the patient's outcome, enlightening them about the true nature of the profession.[22]

This, therefore, explains the many reasons for and against medical students' attitudes toward radiology. Whereas technology and possibilities of professional development are some positives, deficiencies in education and a lack of perceived interaction with patients are serious concerns; both need to be addressed promptly. Such a change in the situation will likely double the number of radiologists in Nigeria and, consequently, the quality and availability of radiology services country-wide. Thus, the curricular frameworks should be updated to expose more students to this speciality through clinical rotations and mentorship programs, linking them to practising radiologists. Such counselling will help iron out various misconceptions relating to patient contact and show, more realistically, what to expect regarding work-life balance. Early involvement of students and exposure to radiology can help develop an interest in the field.

Limitations

Although the present study is valid, it also has the limitation of single-centre involvement and a small sample size. Future research should involve multicentred studies with a larger sample size and preclinical students or newly graduated doctors to understand the various factors affecting radiology as a career choice.

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CONFLICT OF INTEREST: None

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